

2006 RESEARCH PROBLEM STATEMENT

No.:06.02-01

Problem Title: Install Avalanche Sentry Monitoring System

Submitted By: Liam Fitzgerald, UDOT Avalanche Safety Director

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1. Briefly describe the problem to be addressed:

Utah State Road 210 is the only link between Salt Lake Valley, the Town of Alta, the Alta Ski Area, and the Snowbird Resort. The thrust of this project is to provide safe travel for the motorists, and avoid prolonged or unnecessary closures that cost local business significant amounts of revenue.

UDOT currently employs a system of avalanche forecasting, closure, and explosives control to mitigate the avalanche hazard.

This project will install a sophisticated infrasound sound monitoring system and a central command unit to alert users of slides in the area of Little Cottonwood Canyon that is deemed the most dangerous, the White Pine/Tanner Flat Campground slide area. This system will also verify ordinance detonation and snow movement during UDOT's avalanche control work.

2. List the research objective(s) to be accomplished:

1. Demonstrate that distributed, time synchronized sensor array monitoring nodes can be successfully deployed in a continuously operating near real time monitoring system.
2. Confirm that infrasound monitoring can successfully be applied at the mid-canyon area of Little Cottonwood Canyon.
3. Show that the proposed infrasound monitoring system can be easily used by UDOT personnel during operations.
4. Determine whether project results justify adding required system annual maintenance costs to operational budgets, so that the system can be incorporated as permanent utility available to the UDOT avalanche mitigation program

3. List the major tasks required to accomplish the research objective(s):

Estimated person-hours

- | | |
|---|-----------|
| 1. Finalize selection of sensor array monitoring sites (June 2006) | 160 Hours |
| 2. Design and install preliminary system configuration (July – October 2006) | 400 Hours |
| 3. Operate preliminary system and heuristically adjust configuration (October – May 2007) | 330 Hours |
| 4. Optimize and finalize system configuration (June – October 2007) | 310 Hours |
| 5. Operate Optimized system and evaluate performance (October – May 2008) | 230 Hours |
| 6. Project Recommendations (June – July 2008) | |
| 7. Project Conclusion, system removal or refurbishment (July 2008) | |

4. Outline the proposed schedule (when do you need this done, and how we will get there):

See Number 3.

5. Indicate type of research and / or development project this is: **Project is a Large Research Project**

Large: ☐ Research Project ☒ Development Project

Small: ☐ Research Evaluation ☐ Experimental Feature ☐ New Product Evaluation ☐ Tech Transfer Initiative ☐ Other

6. What type of entity is best suited to perform this project (University, Consultant, UDOT Staff, Other Agency, Other)?

Consultant with support from UDOT Avalanche Staff

7. What deliverable(s) would you like to receive at the end of the project? (e.g. useable technical product, design method, technique, training, workshops, report, manual of practice, policy, procedure, specification, standard, software, hardware, equipment, training tool, etc.)

8. Describe how will this project be implemented at UDOT.

Project will follow the original installation program and be utilized in other severe avalanche locations.

9. Describe how UDOT will benefit from the implementation of this project, and who the beneficiaries will be.

UDOT will benefit by increasing the efficiency of the avalanche mitigation program through early notification of natural avalanche activity, control activity verification, ordinance detonation verification and hazard recognition. The traveling public will benefit by reducing the risk of potential avalanche hazards. The State of Utah will benefit by minimizing the economic impact of road closures.

10. Describe the expected risks, obstacles, and strategies to overcome these.

None

11. List the key UDOT Champion of this project (UDOT employee who will help Research Division steer and lead this project, and will spearhead the implementation of the results):

Rukhsana Lindsey, Director of Research, UDOT, Liam Fitzgerald, UDOT Avalanche Safety, Ernie Scott, Inter-Mountain Labs, Inc.

12. Estimate the cost of this research study including implementation effort (use person-hours from No. 3): \$100,000

(Total cost = \$150,000, but with \$100,000 commitment, National Science Foundation will participate for \$50,000)

13. List other champions (UDOT and non-UDOT) who are interested in and willing to participate in the Technical Advisory Committee for this study:

Name	Organization/Division/Region	Phone
A) Barry Sharp	UDOT Research	8019654314
B) Kevin Chartier	Inter-Mountain Laboratories	3076747506
C) Rukhsana Lindsey	UDOT Research Director	8019654196
D) Ernie Scott	Inter-Mountain Labs, Inc.	3077305380
E)		
F)		
G)		

14. Identify other Utah agencies, regional or national agencies, or other groups that may have an interest in supporting this study: